

# The Struggle Is Real: A Systematic Review of Food Insecurity on Postsecondary Education Campuses

Meg Bruening, PhD, MPH, RD; Katy Argo; Devon Payne-Sturges, DrPH; Melissa N. Laska, PhD, RD

## ARTICLE INFORMATION

### Article history:

Submitted 5 December 2016

Accepted 25 May 2017

### Keywords:

Food insecurity  
Emerging adults  
College campuses

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<http://dx.doi.org/10.1016/j.jand.2017.05.022>

## ABSTRACT

**Background** Numerous international studies have examined cross-sectional correlates of food insecurity (FI) among postsecondary education students. Research is needed to synthesize the findings of this work to support vulnerable students.

**Objective** To systematically review peer-reviewed and gray literature to assess the prevalence of FI on postsecondary education institutions, as well as factors related to FI among students and suggested/practiced solutions.

**Design** Systematic literature review. Medline, Web of Science, and PsycINFO databases were searched for peer-reviewed literature for FI research; a Google search (Google Inc) was conducted to obtain gray literature on FI among postsecondary education students.

**Participants/setting** Undergraduate and graduate students at postsecondary institutions of higher education.

**Main outcome measures** Measures included prevalence of FI; sociodemographic, health, and academic factors related to FI; and solutions to address FI on postsecondary institutions.

**Results** Seventeen peer-reviewed studies and 41 sources of gray literature were identified (out of 11,476 titles). All studies were cross-sectional. Rates of FI were high among students, with average rates across the gray and peer-reviewed literature of 35% and 42%, respectively. FI was consistently associated with financial independence, poor health, and adverse academic outcomes. Suggested solutions to address food security among postsecondary institutions addressed all areas of the socioecologic model, but the solutions most practiced included those in the intrapersonal, interpersonal, and institutional levels.

**Conclusions** FI is a major public health problem among postsecondary education students. Studies are needed to assess the long-term influence of FI among this vulnerable population. More research is needed on the effectiveness of FI interventions.

J Acad Nutr Diet. 2017; ■:■-■.

THE TRADITIONAL CONCEPT OF THE POSTSECONDARY education student tends to include younger individuals coming from more affluent families, yet the modern postsecondary education student reflects a paradigm shift in student demographic characteristics.<sup>1,2</sup> Students of low socioeconomic status who may have once dismissed the possibility of degree attainment are now seizing opportunities to pursue postsecondary education.<sup>3,4</sup> Older men and women who may have abandoned college due to past financial hardship, or to raise a family, now have an opportunity to complete degree programs.<sup>5-7</sup> Single parents who may not have previously considered pursuing an education are realizing the advantage of obtaining a degree<sup>8</sup> and are seeking to enroll in postsecondary education institutions. These students, who vary so greatly in age, background, and socioeconomic status, are all working toward the same goal: To gain crucial skills and position themselves in a place of greater prosperity and well-being. Yet adequate

nutritious food, a basic need for human well-being, may not consistently be available to these students. As such, one emerging area of concern among college students and postsecondary education institutions is food insecurity (FI),<sup>9</sup> or the lack of consistent access to safe and healthy foods. Among children and adolescents, FI has been shown to be related to higher stress and anxiety,<sup>10</sup> poorer academic outcomes,<sup>10</sup> and poorer nutritional status and health outcomes.<sup>11,12</sup> Among adults, FI is linked to lower work productivity<sup>13,14</sup> and chronic disease.<sup>15,16</sup> The long-term effects of FI among college students has yet to be explored.

Articles in the popular press about FI on college campuses have become more frequent, having been featured by outlets from *The Chronicle of Higher Education*<sup>17</sup> to *The New York Times*.<sup>18,19</sup> An active, national association for food pantries on college campuses, College and University Food Bank Alliance, now has more than 375 members.<sup>20</sup> A clearer understanding of the scope of the problem of FI on college campuses is

## RESEARCH

needed, as well as a better understanding of a comprehensive range of strategies that are being used to help college students facing FI. Thus, the aim of this study was to systematically review both the peer-reviewed and gray literature to obtain a holistic picture of what is known about FI and what is being done about FI at postsecondary education institutions. By synthesizing the existing literature base on FI at postsecondary institutions, we can collectively design more effective prevention interventions for this vulnerable population.

## METHODS

To explore FI among postsecondary students in depth, we conducted a systematic review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement guidelines. According to the US Department of Agriculture (USDA), there are four thresholds of food security:<sup>21</sup> food security, marginal food security, low food security, and very low food security. Low food security and very low food security are the terms that describe FI. The notion that college students are increasingly FI has gained growing attention during recent years from government entities, educational entities, and faith-based and philanthropic organizations, among others. Considering the rate at which this issue is gaining popular attention, both peer-reviewed literature and gray literature were explored to present a more inclusive, broad picture of the issue at hand. Gray literature included published (not peer reviewed) reports, student theses, conference presentations, newsletters, and data published on websites. Peer-reviewed literature was identified by searching Medline (ie, PubMed), Web of Science, and PsycINFO electronic databases. All text fields were searched (title, abstract, and full-text), and articles published in English between January 2001 and August 2016 were eligible for consideration. To provide a more accurate representation of the subject matter, materials from all geographic regions were accepted. Search terms were *hunger*, *food insecurity*, *food security*, *food hardship*, and *food secure* in combination with/and *tertiary education*, *university*, *college*, *college campus*, *community college*, and *college students*. Gray literature was identified via Google search (Google Inc) using the above search terms with the removal of "with/and" in the search text. Lab notes, excel sheets, and citation managers were used in conjunction to manage the data selection and extraction records.

## Selection Criteria

Two reviewers (K. A., M. B.) independently screened peer-reviewed articles retrieved from electronic databases for eligibility. Studies were only included when they assessed FI among postsecondary student populations (including vocational, undergraduate, graduate, and professional students). Animal studies, metabolism studies, and articles exploring satiety, eating motivation and behavior, and nutritional status (that did not measure FI and/or study a postsecondary student population) were excluded. Titles, abstracts, and full-text (when necessary) were reviewed to assess eligibility of studies based on these criteria.

To identify gray literature, Google search results were screened for any relationship to FI among college students for

the first 250 results, or until 2 pages (50 possibilities) without any relevant results, before the next set of search terms were input. All search term combinations, page titles, and URLs for eligible results were documented for further assessment. After all search combinations were documented, URLs were then reassessed to ensure that eligible sources contained new data not previously identified in the peer-reviewed literature search. All gray literature sources were screened, identified, and documented between May 23, 2016, and July 20, 2016.

## Data Extraction

M. B., M. N. L., and D. C. P. reviewed the peer-reviewed literature and extracted the following data: data collection frame, study design and analytical approach, setting, sample demographic characteristics, FI measures, outcome measure(s), prevalence of FI, and results. We extracted all results and categorized the results into demographic (eg, race/ethnicity and age), health (eg, eating behaviors, mental health, and weight status), and academic (eg, grade point average and retention) outcomes. M. B. and K. A. reviewed the gray literature for source type (eg, report, student thesis, abstract, website, or press article), year data were collected, sample size, prevalence of FI, and factors associated with student FI. Themes for suggested solutions and interventions in practice were categorized across both the peer-reviewed literature and gray literature. We calculated unweighted mean prevalences of FI, low, and very low food security in the respective types of studies. If more than one measure was used to assess food insecurity, the more comprehensive measure was used to calculate the average.

## RESULTS

## Overview of Included Studies

A total of 18,608 records were identified through peer-reviewed electronic databases ( $n=15,538$ ), Google searches ( $n=3,060$ ), and other peer-reviewed sources ( $n=10$ ) (see the [Figure](#)). After removing duplicates, 11,476 titles were screened ( $n=10,636$  peer-reviewed and  $n=840$  gray literature). Of these articles, 11,394 were excluded after title and abstract analysis revealed they did not meet inclusion criteria outlined in the methods. The remaining 82 full-text articles ( $n=22$  peer-reviewed and  $n=60$  gray literature) were then screened. Fourteen peer-reviewed articles were excluded for not assessing prevalence of FI or providing new data, and 9 gray literature sources were already included among the peer-reviewed literature, resulting in a total of 23 excluded full-text articles. The remaining 18 peer-reviewed papers and 41 gray literature sources were found to meet all inclusion criteria and were included in the analysis. Two peer-reviewed papers used an identical sample,<sup>22,23</sup> so those are considered here as one study. In the gray literature, 3 gray literature items came from the University of Alaska, Anchorage,<sup>24-26</sup> and 2 studies came from Michigan Technical University.<sup>27,28</sup> These were combined for two items from each respective institution. Gray literature was further divided to explore current ( $n=17$ ) and proposed solutions ( $n=24$ ) addressing student FI. In total, this systematic review examined the findings from 59 peer-reviewed and gray literature articles assessing the prevalence of and factors contributing to FI among higher education students, as well as provides an in-depth exploration of current and proposed interventions and

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